

Merits And Demerits of Different Routes of Hysterectomy For Gynecological Conditions Without Uterine Descent

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Abstract:

Objective:

- To evaluate the merits and demerits of abdominal, vaginal and laparoscopic assisted vaginal hysterectomy and assess the outcome.
- To study the best possible route of approach for hysterectomy with minimal complications for gynaecological conditions without uterine descent.

Material And Methods

Study design:- An Observational and Prospective study was conducted at Gandhi Hospital Secunderabad, Telangana for two years from August 2014 to July 2016. Total 150 Patients who met inclusion criteria and surgically fit were selected from women admitted for hysterectomy for benign gynaecological condition. They were randomized into one of surgical procedure like total abdominal hysterectomy, vaginal hysterectomy and laparoscopic assisted vaginal hysterectomy. 50 cases were allotted to each group. The characters like age, parity, BMI, cases with previous cesarean section, uterine size and comorbid conditions like hypertension, diabetes were matched in all three groups. Then intra operative parameters like operating time, intra operative blood loss, visceral injuries were noted. Post operative parameters like post operative fever, urinary tract infections, D3 pain level index, Post Urinary tract, Post operative day of ambulation, Abdominal wound infection/vaginal cellulitis/local hematoma (if any), Fall in haemoglobin, Blood transfusion, Blood transfusion, Post operative hospital stay were noted in all three routes of hysterectomy and analyzed.

Results: The operating time was shortest in TAH(65.38 mins) and longest (128.6 mins) in LAVH. Blood loss was more for VH and minimum for LAVH. Fall in Hb followed the same order VH(1.9gr%) > TAH 1.2g% > LAVH 0.76gr%. Blood transfusion was given in 5 cases (10%) cases in VH and 3 cases (6%) in TAH. There was no need of blood transfusion in LAVH. When intra operative visceral injuries were compared there was only one (2%) case of bladder injury identified under VH and TAH respectively. No visceral injuries were found in LAVH. Coming to post operative parameters it was observed that 10 patients (20%) in TAH, 4 cases (8%) in VH and only 2 patients (4%) in LAVH suffered from fever. The incidence of postoperative urinary tract infection and wound infection was high in TAH than VH and LAVH. Day 3 mean pain score was minimal in LAVH (2.02 cm), moderate in VH (3.7 cm) and maximum in TAH (5.8cm). Post operative ambulation was earlier in LAVH and VH compared to TAH. Mean Hospital stay was less in LAVH (4 Days) and VH (5 Days) when compared to TAH which was 9.8 Days.

Conclusion: No procedure is 100% ideal. The ideal method can be chosen for a patient by skilled surgeon by discussing with his patient.

Aims And Objectives

Aim of the study:- To evaluate the merits and demerits of abdominal, vaginal and laparoscopic assisted vaginal hysterectomy and assess the outcome. To study the best possible route of approach for hysterectomy with minimal complications for gynaecological conditions without uterine descent.

Objective of the study:-

- Comparing the intraoperative parameters.
- Comparing the post operative parameters in total abdominal hysterectomy, undescended vaginal hysterectomy and laparoscopic assisted vaginal hysterectomy.

I. Introduction

Hysterectomy is the most common gynaecological Surgery performed on women next to caesarean section. Hysterectomy remains one of the most frequently performed gynaecological operations. The introduction of antisepsis, anaesthesia, antibiotics and blood transfusion has made hysterectomy a safe procedure. The common indications for hysterectomy are symptomatic or growing myomas, adenomyosis,

dysfunctional uterine bleeding, chronic pelvic inflammatory disease, endometriosis and prolapse. The abdominal route to hysterectomy is most popular and remains the route of choice in dealing with large size uterus, ovarian masses and gynaecological malignancies. Vaginal route was used initially for prolapse of uterus. But it has become more widely utilized for dysfunctional uterine bleeding (DUB), fibroid and other benign conditions when the uterus is a fairly normal size. With safe electrosurgical techniques Laparoscopic assisted vaginal hysterectomy can now be performed even for large masses and malignancies. Laparoscopic surgeries have long learning curve and need sophisticated equipment and expertise.

Ideal method of hysterectomy should have

1. Low morbidity,
2. Low health care cost,
3. Less operating time,
4. Less duration of hospital stay,
5. Minimally invasive and
6. Better patient satisfaction.

As no procedure is ideal, the present study aims to evaluate the merits and demerits of abdominal, vaginal and laparoscopic assisted vaginal routes of hysterectomy for undecidated uterus in comparison with one another.

II. Material And Methods

Study design :- Observational and Prospective study.

Place of study :- Department of obstetrics and Gynaecology, Gandhi hospital.

Number of cases :- Total 150 cases

TAH-50, LAVH-50, VH-50

Duration :- 2yrs. August 2014 to July 2016

Study population:- Women attending Gynaecology outpatient department with gynaecological problems like DUB, fibroid etc who have completed their family and had been decided for surgical management were admitted.

Inclusion criteria:-

1. Cases with good uterine mobility
2. Uterine size less than 12 weeks,
3. No previous multiple surgeries (> or = 2)

Exclusion criteria:-

1. Genital prolapse cases.
2. Associated adnexial pathology.
3. Genital tract malignancy.
4. H/o two or more caesarean sections.
5. Size >12wks.
6. Morbid obesity (BMI >40)

Management protocol

History and examination

For each case presenting complaints, duration and history regarding medical treatment in the past were evaluated. General examination was done. Gynaecological examination, Per abdominal, per speculum and per vaginal examination was done.

Investigations

The following investigations were done.

Blood grouping, HIV, HBSAG

Complete blood picture,

Random blood sugar

Blood urea, serum creatinine

Serum electrolyte

Complete urine examination

Chest x ray, ECG,

Ultrasound abdomen and pelvis

Pap smear Endometrial biopsy For all cases who met the inclusion criteria and were surgically fit were randomized into one of the three surgical approaches.

Written and informed consent was taken.

Pre-anaesthetic check up was done followed by hysterectomy.

Parameters Evaluated

Intra operative

- Mean operating time
- Intra operative blood loss [(wet mops weight-dry mops weight)+ blood collected in suction bottle]
- Bladder/bowel/ureter injury.

Post operative

Post operative fever

- Urinary tract infection(UTI)
- Day 3 pain level index (visual analogue scale is used)
- Post operative day of ambulation
- Abdominal wound infection/vaginal cellulitis/local hematoma (if any)
- Fall in hemoglobin
- Blood transfusion
- Post operative hospital stay

All the above mentioned measurements were compared in the three groups and results were analysed.

III. Observation And Analysis

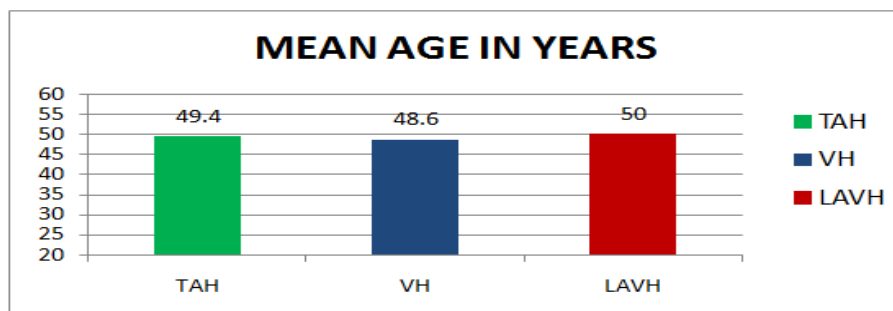
Total numbers of cases studied were 150 and were randomly allocated to three different groups. Total abdominal hysterectomy was performed in 50 patients, vaginal hysterectomy was performed in 50 patients and another 50 cases were operated through Laparoscopic assisted vaginal hysterectomy. Henceforth, throughout this dissertation the Total abdominal hysterectomy, vaginal hysterectomy, laparoscopic assisted vaginal hysterectomy groups are referred to as TAH, VH and LAVH respectively. The three routes were compared for predetermined intraoperative and postoperative parameters and results were analyzed. For testing the equality of means among the groups, student’s T test was carried out for those characteristics of continuous nature. In all the cases, the p value was noted.

1. Patient demographic characteristics

The patient’s demographic characteristics in the three groups are shown in table 2.1 and figure 2.1. Mean and standard deviation and p values of the age, parity and BMI were determined. All the THREE p values were greater than 0.05. This indicates that there is no significant difference among the groups with reference to age, parity and BMI. Thus any discrepancies in the results of the study related to age, parity and BMI and number of previous pelvic surgeries are excluded

	n	Age in years		Parity		BMI	
		Mean	SD	Mean	SD	Mean	SD
TAH	50	49.6	11.89	2.9	1.40	21.512	2.31
VH	50	48	11.41	3	1.34	21.238	1.33
LAVH	50	50	8.14	2.5	0.76	21.714	1.19
MEAN		49.2		2.83		21.488	

Table – 2.1 Demographic data



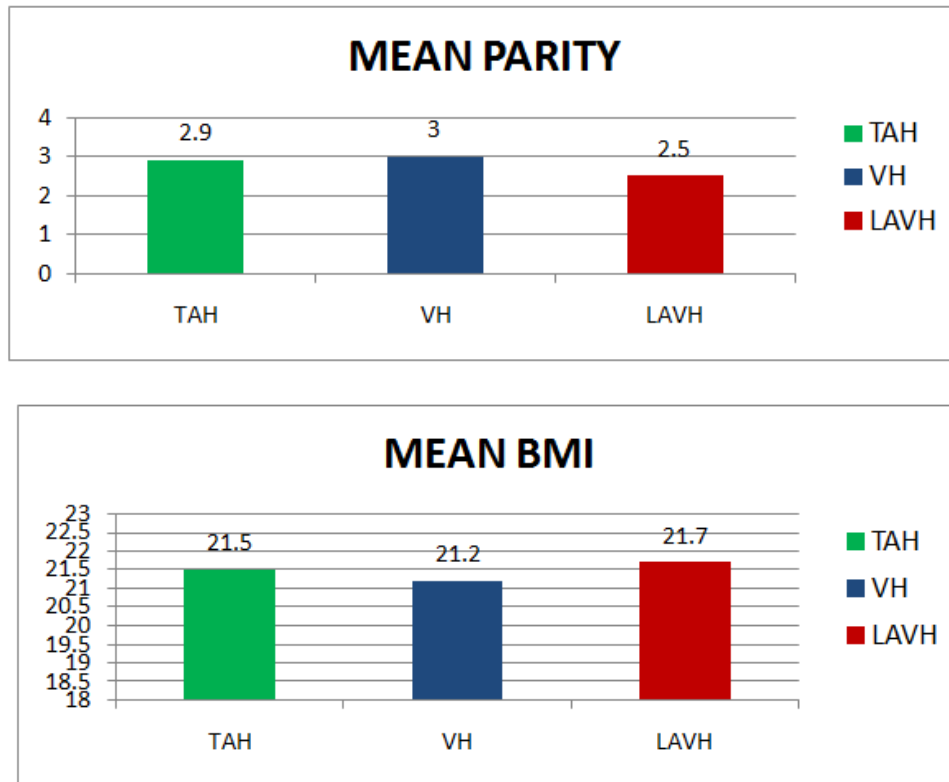


Figure 2.1 Patient demographic characteristics

Surgical history

Patients with previous history of Caesarean sections (CS) are considered.

Group	Cases With Previous Caesarean Section		Cases Without Previous Surgeries	
	NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
TAH	10	20%	40	80%
VH	9	18%	41	82%
LAVH	11	22%	39	74%

Table 2.2 cases with previous history of caserean section

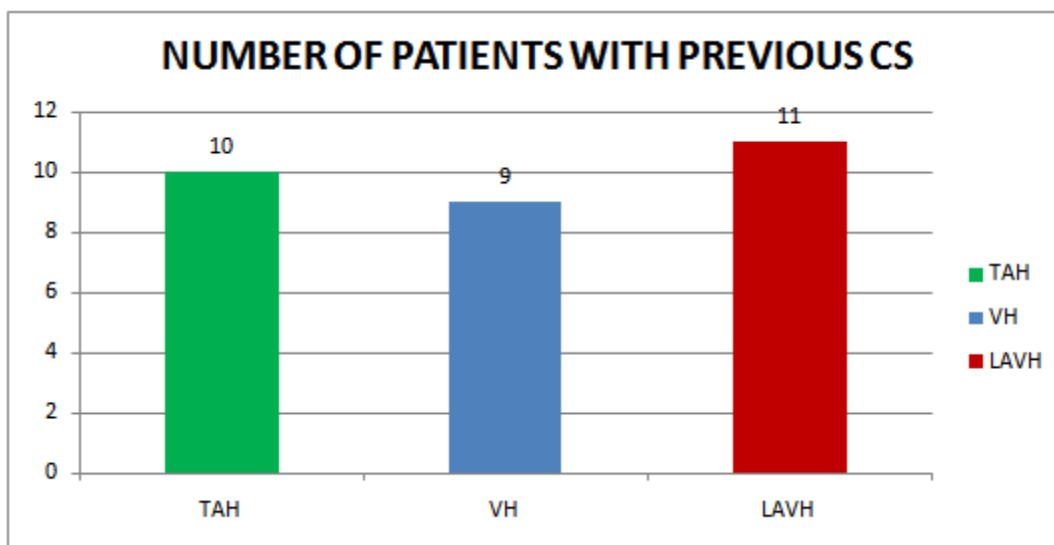


Fig 2.2 graph representing the number of cases with history of caesarean section in each group

Medical history

Medical Disorder	Tah	Vh	Lavh
Hypertension	9	10	8
Diabetes Mellitus	3	4	3

Table 2.3 – cases with medical co-morbidities

Uterine size

All the patients were grouped into 2 categories based on the uterine size i.e. ≤ 8 weeks and > 8 weeks.

Uterine size	TAH	VH	LAVH
≤ 8 weeks (no. of cases)	26	26	25
>8 weeks (no. of cases)	24	24	25

Table 2.4 – number of cases in each group with uterine size ≤ 8 weeks and > 8 weeks.

Indications for hysterectomy

Diagnosis	TAH	VH	LAVH
Fibroid	20	12	14
DUB	15	20	18
Adenomyosis	8	12	13
Simple Hyperplasia	5	1	2
Chronic Cervicitis , Pelvic Inflammatory Disease	2	5	3

Table 2.5 – number patients in each group based on Indication for hysterectomy.

Analysis of Various Parameters

Intra-Operative

1. Mean operating time

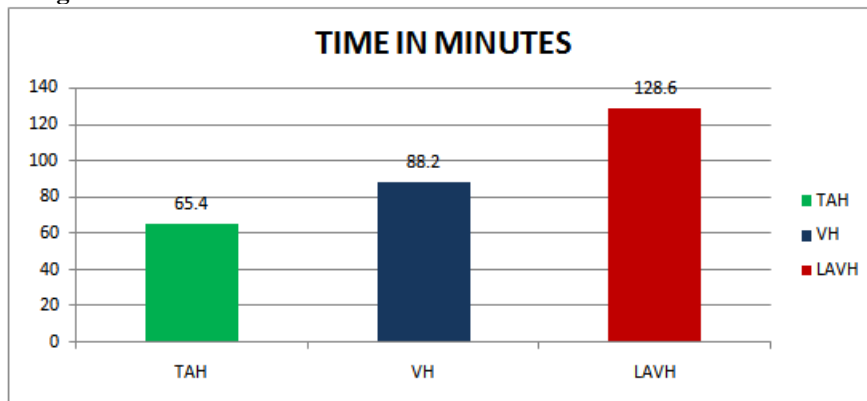


Figure 2.3 Mean operating time in minutes for each group

2. Intraoperative blood loss

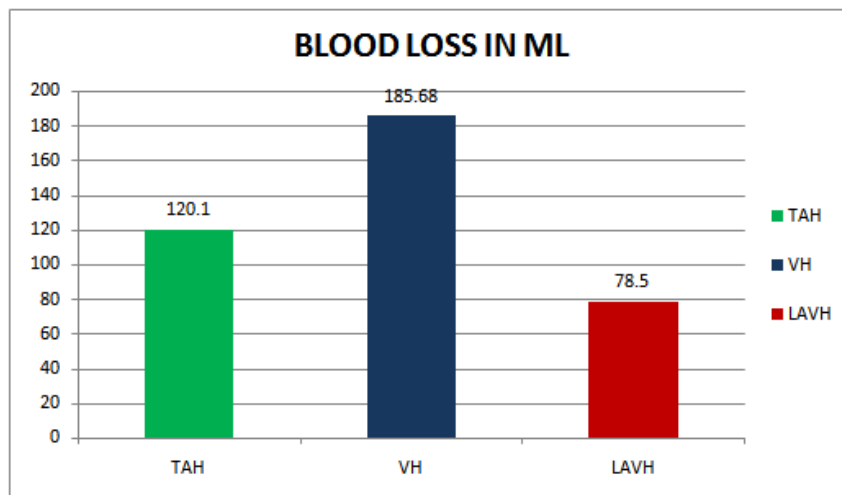


Figure 2.4 Mean operating time in min for each group

3. Fall in haemoglobin level in each group

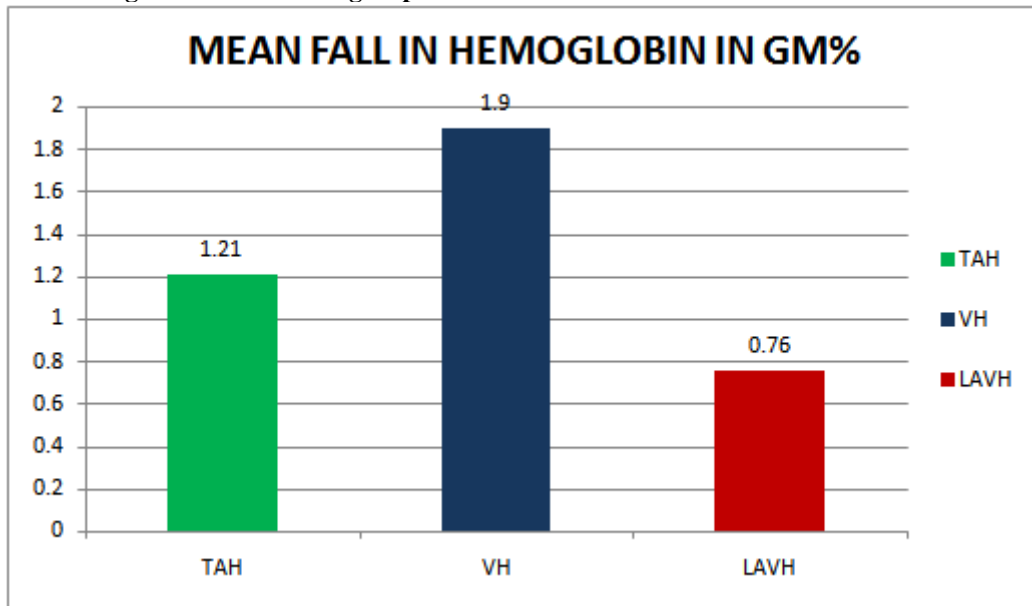


Figure 2.5- graph showing mean fall in haemoglobin in each group

4. Visceral injury

Type of surgery	NUMBER OF CASES WITH		
	BLADDER INJURY	BOWEL INJURY	URETER INJURY
TAH	-	-	-
VH	1	-	-
LAVH	1	-	-

Table 2.9 – Number of cases with visceral injuries in each group

Post operative parameters

1. Post operative fever

Table 2.10 – Number of cases with postoperative fever in each group

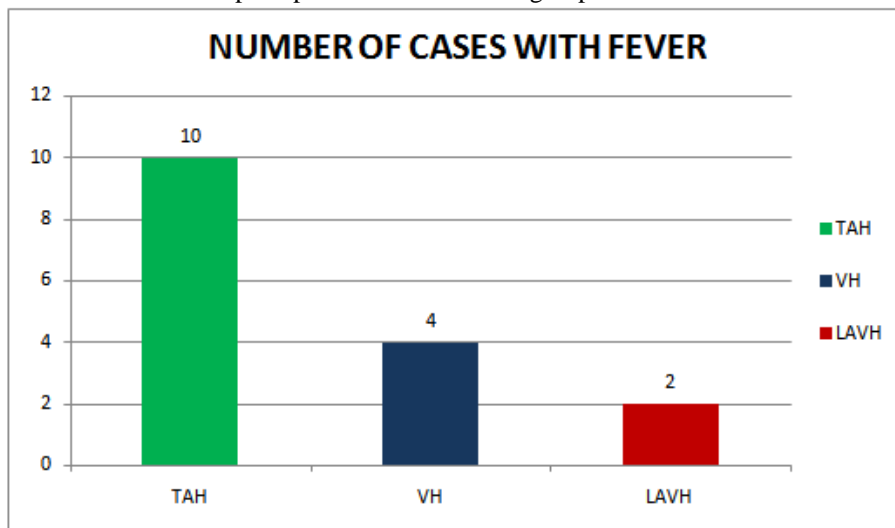


Figure2.6 –Graph showing Number of cases with fever in each group.

2. Number Of Cases With UTI

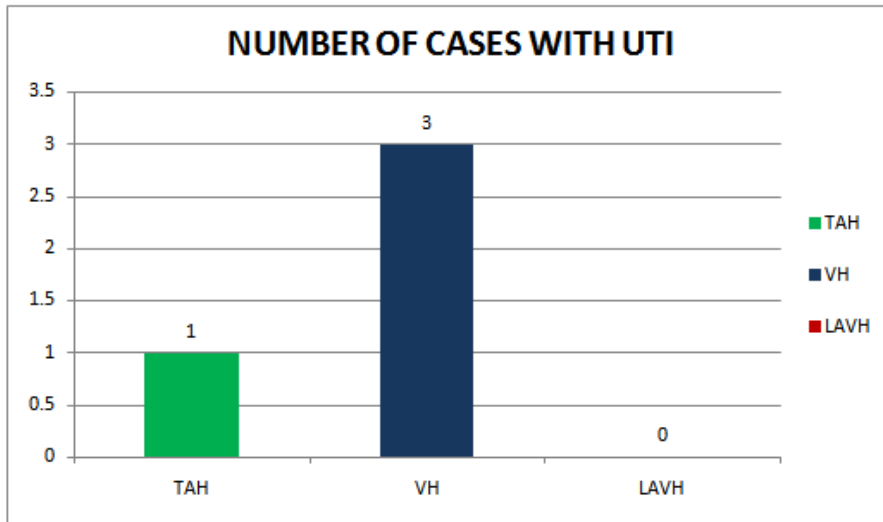


Figure 2.7 Graph showing number of postoperative UTI cases in each group.

3. Wound infection

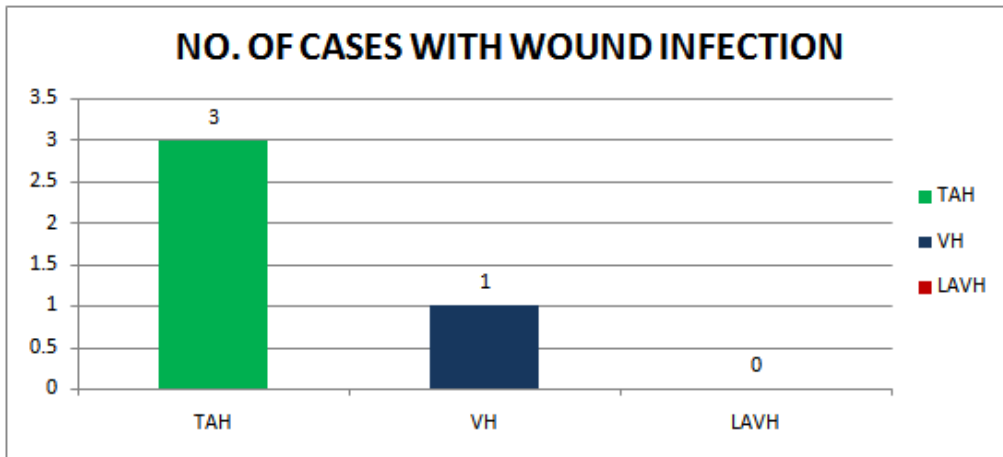


Figure 2.8 Graph showing number of cases with wound infection in each b group.

4. Pain level index on day 3

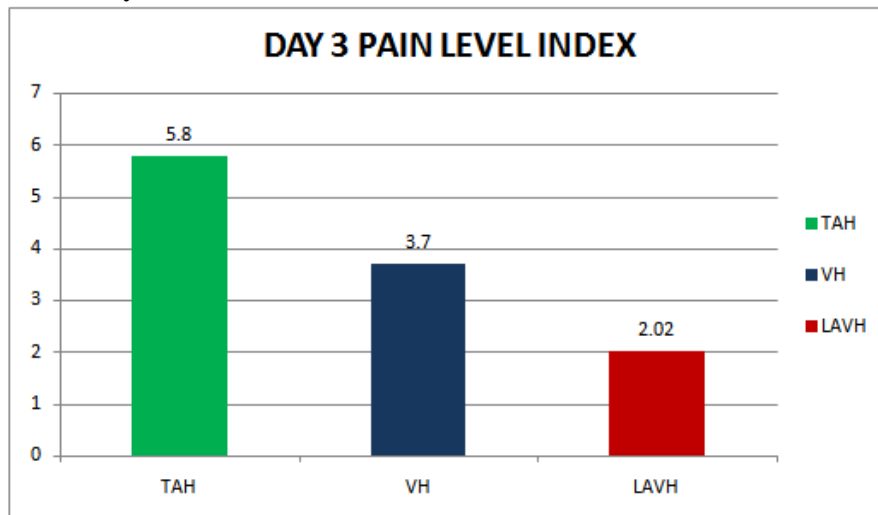


Figure 2.9 Graph showing the mean day 3 pain index in each group.

5. Post operative day of ambulation

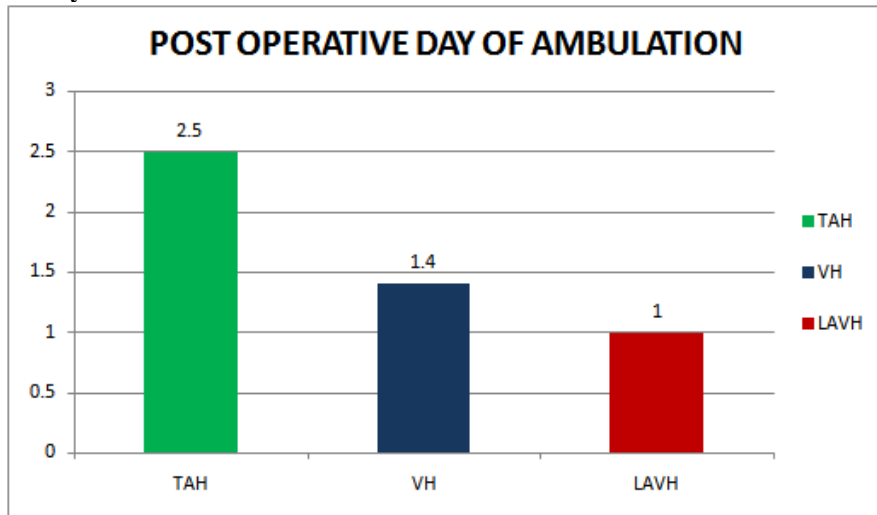


Figure 2.10 – Graph showing the mean postoperative day of ambulation

6. Blood transfusions

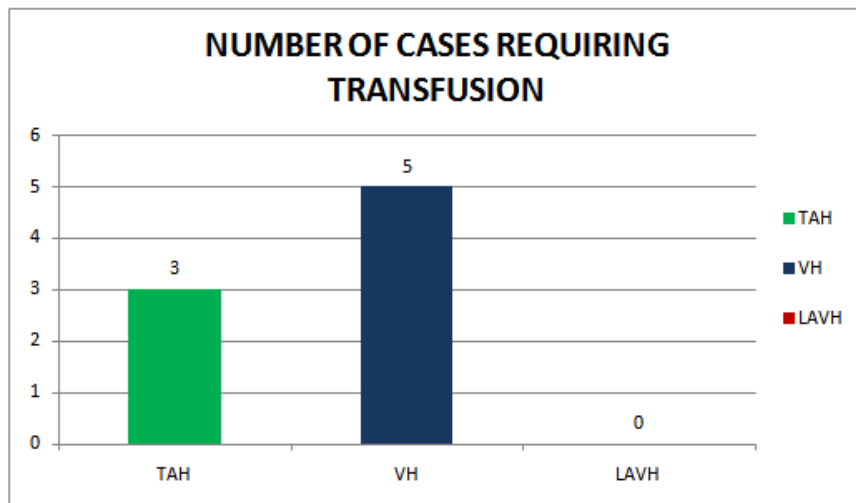


Figure 2.11 Graph showing patients requiring postoperative blood transfusion.

8. Mean Post Operative Hospital Stay

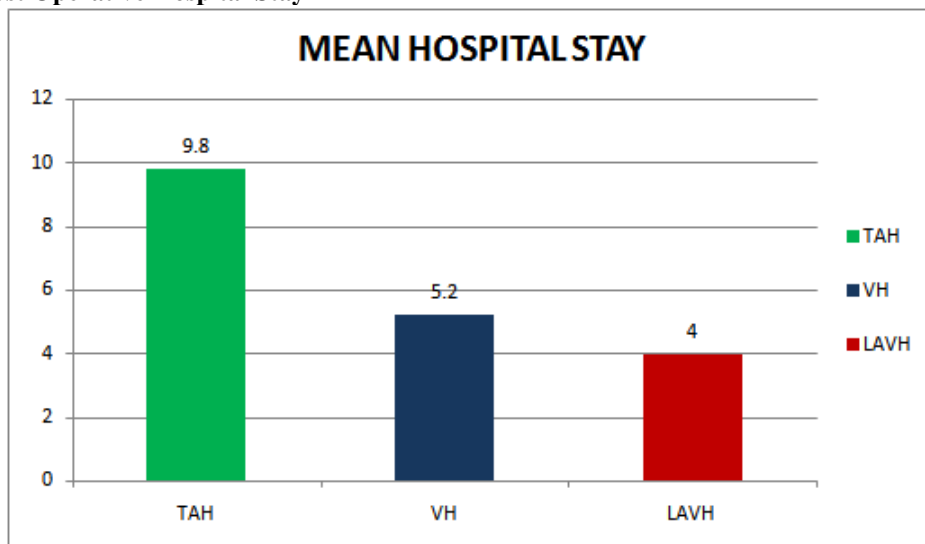


Figure 2.12 Graph showing mean hospital stay

IV. Discussion

The study was conducted in GANDHI HOSPITAL from August 2014 – July 2016. The study was a observational and prospective study which involved 150 patients. Patients who met the inclusion criteria of the study were randomized to one of the three surgical approaches i.e Total abdominal hysterectomy, Vaginal hysterectomy and laparoscopic assisted vaginal hysterectomy.

Baseline characteristics of the three groups of patients were identical and comparable to other standard studies.

AGE, PARITY AND BMI –

Mean age in the three groups were TAH – 49.64 years , VH – 48.6 years and LAVH – 50 years and p value was 0.99 which shows there is no significant difference in age between these three groups. The mean age of hysterectomy in Christina Schindelbech (2008) was 46 years and E.David montefier et all (2007) was 51.4 years and for our study was 49.4 which was comparable to other studies.

Mean parity of patients undergoing hysterectomy was TAH – 2.9 , VH – 3, LAVH – 2.5 and p value is 0.97 indicating no significant difference among three groups. Mean BMI among these groups was almost similar with p value of 0.997.

The Parity and BMI were comparable with the standard studies as shown below.

Study	parity	BMI
Michel S, Hoffman et all (1994)	2.8	-
E.David montefire et all	2±1.6	25±5.7
Present study	2.91	21.4

Table 2.18 – comparison of mean parity and BMI with other studies

Hence the above mentioned factors did not effect the outcome of parameters evaluated.

Previous Surgical And Medical History

There were 10 cases with previous history of caesarean section in TAH group and 9, 11 in VH and LAVH respectively. P value was 0.9 which nullifies the effect of previous caesarean section on the difference in parameters evaluated among the three groups.

There were 9 cases of hypertensive and 3 diabetics in TAH group, 10 hypertensive and 2 diabetics in VH and 8 cases of hypertensive and 1 diabetic patient in LAVH group.

Each group contains almost equal percentage of hypertensive and diabetic patients.

Indications

Most common benign indications of hysterectomy include symptomatic Uterine fibroid, dysfunctional uterine bleeding, endometriosis, adenomyosis (Stang et al. 2012; Schindlbeck et al. 2008). Uterus fibroid was the most common indication for a hysterectomy (Muller A. et al. 2004).

Fibroid and DUB were the main indications for surgery in the study by Pradeep Kumar Garg et all, Singh Abha et all and Dewan Rupali et all.

In our study the main indications for hysterectomy were Dysfunctional uterine bleeding (35.3%), fibroid (30.3%) and other causes include adenomyosis (22.2%), Chronic PID (6.6%) and hyperplasia of uterus (5.3 %).

Uterine Size

In our study 26 patients (52%) in the TAH group and 26 patients (52%) in the VH and 25patients (50%) in LAVH group had uterine size less than or equal to 8weeks of gestation. 24 patients (48%) in the TAH group and 24 patients (48%) in the VH and 25patients (50 %) in LAVH group had uterine size more than 8 weeks of gestation.

The three study groups were comparable with respect to their uterine size.

Intra Operative And Postoperative Parameters

Time Taken for Surgery:

FACTORS	TYPE OF SURGERY	MEAN (SD)	t VALUE	df	P VALUE
TIME IN MINUTES	TAH	65.38(12.81)	7.43	98	<0.001
	VH	88.2(17.56)			
	TAH	65.38(12.81)	29.03	98	
	LAVH	128.6(8.29)			
	VH	88.2(17.56)	14.69	98	
	LAVH	128.6(8.19)			

Table 2.20 – Time taken for surgery in each group along with paired t values between groups

Time was noted from the first incision on the mucosa/skin to the end of surgery in minutes. In TAH group mean duration was 65.38 Min, 88.2 Min in VH group and 128.6 min in LAVH group.

The operation duration was shortest by TAH and longest by LAVH. P value for all the three groups is < 0.001 which was statistically significant.

TAH being open procedure with firm control over the surgical technique and most commonly used route of practice in our institute required less time when compared to other routes. A relatively large uterus or the presence of adhesions resulted in prolonging the operation time of the LAVH and VH.

According to **Cochrane meta analysis study**¹ mean time taken was in the following order LAVH>VH>TAH. Mean difference in time between laparoscopic and vaginal hysterectomy is 39.3 min and between VH and TAH is 20.3 min with the surgical time (mean difference of 39.3 minutes), which is comparable with our study.

Blood Loss During Surgery And Fall In Hemoglobin

Blood loss was calculated from the difference in weight of wet mops and dry mops along with the blood collected in suction bottle. Fall in hemoglobin is measured by the difference between pre operative and post operative day 2 hemoglobin levels.

Mean blood loss in the TAH group is 120.1 ml, VH group is 185.68 ml; and in LAVH IS 78.5ml. The blood loss among the three groups were compared and the p value obtained was <0.001, which was statistically significant.

	TYPE OF SURGERY	MEAN (SD)	t VALUE	df	P VALUE
BOOD LOSS IN ML	TAH	120.1(13.95)	14.57	98	<0.001
	VH	185.68(28.6)			
	TAH	120.1(13.95)	18.65	98	
	LAVH	78.52(7.33)	25.66	98	
VH	185.68(28.6)				
	LAVH	78.52(7.33)			

Table 2.21 blood loss during surgery along with paired t values between groups

	Type of surgery	MEAN (SD)	t value	df	P value
FALL IN HEMOGLOBIN	TAH	1.21(0.22)	12.61	98	<0.001
	VH	1.89(0.31)			
	TAH	1.21(0.22)	11.65	98	
	LAVH	0.76(0.16)	22.59	98	
VH	1.89(0.31)				
	LAVH	0.76(0.16)			

Table 2.22 – Mean fall in haemoglobin in each group along with paired t values between

Blood loss was highest for vaginal route and lowest for laparoscopic route. Fall in hemoglobin level also followed same order with VH(1.9GM%)>TAH(1.21GM%)>LAVH(0.76GM%).

In our study blood transfusion was given in total of 8 cases with 5 cases in VH group and 3 cases in TAH group.

Type of surgery	Number of cases given blood transfusions.	Chisquare value	df	P value
TAH	3	0.54	98	0.46
VH	5			
TAH	3	3.09	98	0.078
LAVH	0			
VH	5	5.26	98	0.021
LAVH	0			

Table2.23 number of cases required blood transfusion along with p value

P value between the VH and LAVH for requiring blood transfusion in 0.021 (<0.05) was statistically significant. But the p value between the other groups was not significant.

According to study done by **Makinen et al.**,² The intra-operative bleeding requiring surgical intervention during hysterectomy was more common with vaginal hysterectomy (3.1%) compared with 2.1% in abdominal hysterectomy.

Schindlbeck et al.³ compared the hysterectomy performed by laparoscopy (n = 43), vaginal (n = 87) and abdominal routes (n = 103), with the intraoperative blood loss being 200 ml, 300 ml, 250ml, respectively; p=0.07.stating more blood loss for vaginal hysterectomy.

The results of above two studies regarding blood loss were comparable with our study.

Intraoperative Visceral Injury

Intraoperative bladder, ureter and bowel injuries were recorded.

There were no visceral injuries in TAH group. There was one case of bladder injury in LAVH and one case in VH. There were no bowel injuries and ureteral injuries recorded in our study.

P value was 0.314 (> 0.05), which shows that the difference rate of injuries among three groups in our study is statistically not significant.

Injury	TAH	VH	LAVH
Bladder	0	1	1
Ureter	0	0	0
Bowel	0	0	0

Table 2.24 number of cases with visceral injuries in each group.

In **Donnez et al** study, Bladder injuries occurred in 0.44% of women undergoing vaginal hysterectomy and 0.31% in those undergoing laparoscopic hysterectomy. There was no difference in the rate of ureteral injury after vaginal (0.33%) and laparoscopic hysterectomy (0.25%).

In a **meta-analysis by Johnson et al⁴**, laparoscopy was associated with increased risk of urinary tract lesions compared with abdominal hysterectomy.

Post Operative Fever, Wound Infection, Pelvic Collection And Uti –

Patients were monitored with daily temperature chart during their hospital stay. And the patients with increased temperature (>38° C) for more than 24 hours of duration are investigated for the source of infection and treated accordingly.

In our study Number of cases reported with fever in TAH, VH and LAVH are 10, 4 and 2 respectively.

Type of surgery	Number of cases with fever	Chisquare value	df	P value
TAH VH	10 4	2.9	98	0.08
TAH LAVH	10 2	6.06	98	0.01
VH LAVH	4 2	0.79	98	0.39

P value between the TAH and LAVH is 0.01 which was statistically significant but the p value between the other groups was not statistically significant.

Type of surgery	Number of cases with UTI	Chisquare value	df	P value
TAH VH	1 3	1.04	98	0.3
TAH LAVH	1 0	1.01	98	0.314
VH LAVH	3 0	3.09	98	0.078
Type of surgery	Number of cases with wound infection	Chisquare value	df	P value
TAH VH	3 1	1.04	98	0.30
TAH LAVH	3 0	3.09	98	0.078
VH LAVH	1 0	1.01	98	0.314

For UTI and Wound infection p value >0.05 among all the groups which was not significant.

In TAH group out of 10 cases with fever majority of cases (3 cases) were due Superficial Wound infection which was managed with Antibiotics and regular dressings. 2 cases had pelvic collection and one case had UTI. In another 2 cases it was associated with blood transfusion and in remaining 2 cases it was of unknown origin.

Among the VH group the 4 cases of fever were due to UTI in one case, UTI plus pelvic collection in one case, due to wound infection in one case and blood transfusion in another case.

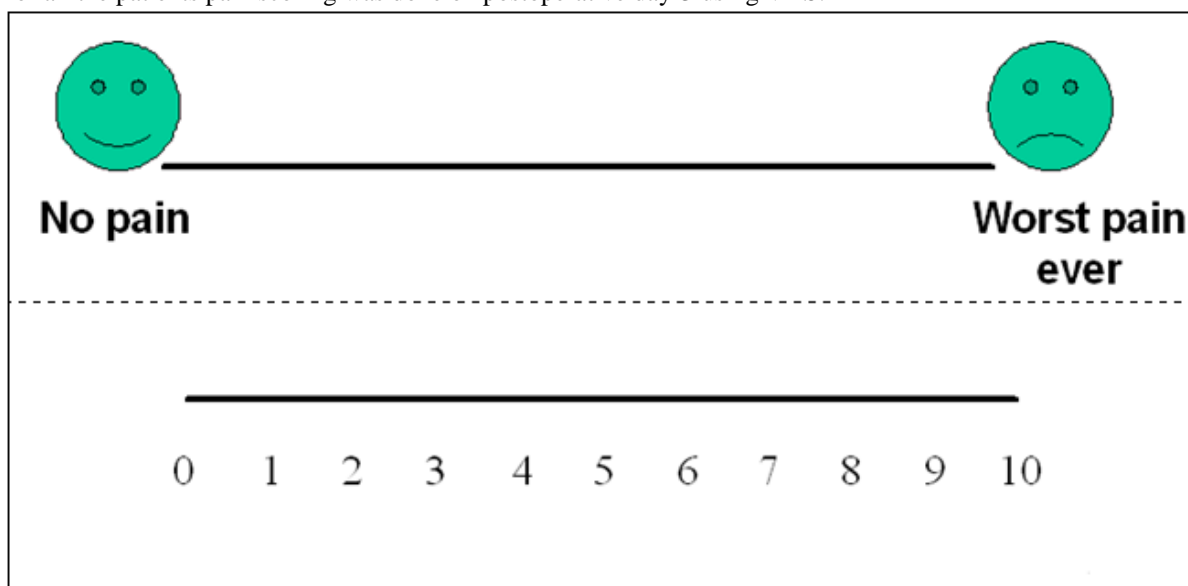
In LAVH group there were only 2 cases of fever, one due to pelvic collection and another of Unknown origin. There were no cases with wound infection.

In a meta-analysis by Johnson et al⁴ Laparoscopy was associated with fewer infections (OR 0.32), fewer episodes of fever (OR 0.65), compared with abdominal hysterectomy. Similar findings were noted comparing vaginal and abdominal hysterectomy.

In the study in Finland during 1996 by Makinen et al.,² Infections (wound, intra-abdominal ,vaginal, urinary tract, fever of unknown origin, etc.) were the most frequent complications, with an incidence of 10.5%, 13% and 9% in the abdominal, vaginal and laparoscopic hysterectomy groups, respectively.

Day 3 Pain scoring on Visual Analog Scale (VAS)

For all the patients pain scoring was done on postoperative day-3 using VAS.



Visual Analog Scale

		MEAN(S.D)	t value	df	P value
D 3 PAIN LEVEL INDEX	TAH	5.8(1.5)	8.96	98	<0.001
	VH	3.8(0.7)			
	TAH	5.8(1.5)	16.47	98	<0.001
	LAVH	2(0.62)			
	VH	3.8(1.5)	12.61	98	<0.001
	LAVH	2(0.62)			

In our study D3 pain score in TAH group was 5.8 cms. Mean pain score in VH group was 3.7cms and in LAVH was 2.02 cms.

The difference in the pain rating scoring among the three groups was found to be statistically significant with a value <0.001. Study proved that post operative patient comfort was very much increased with LAVH. This was the one of the important advantages of LAVH over TAH.

According to eVALuate study one of the advantages of laparoscopy over TAH is that the former procedure was less pain.

According to Schindlbeck et al.³ need of analgesics was less in LAH group compared to VH and TAH.(1.5 vs. 2 vs. 4 days, respectively; p<0.01).

Day of ambulation

The mean day of ambulation was 2.5 days for TAH, 1.4 days for VH and 1 day for LAVH.

DAY OF AMBULATION					
	TAH	2.5(1.82)	8.54	98	<0.001
	VH	1.4(2)			
	TAH	2.5(1.82)	9.32	98	<0.001
	LAVH	1(0.91)			
	VH	1.4(2)	2.57	98	0.01
	LAVH	1(0.91)			

p value for all the three groups was < 0.05 which was statistically significant difference.

The **eVALuate study**⁵ confirmed some advantages of laparoscopy as faster postoperative recovery, and better quality of life in the short term when compared with laparotomy.

Hospital stay

In our study mean hospital stay for TAH was 9.8 days, VH was 5.2 days and 4 days was LAVH.

HOSPITAL STAY	TAH	9.8(0.68)	11.47	98	<0.001
	VH	5.2(0.61)			
	TAH	9.8(0.68)	19.46	98	<0.001
	LAVH	4(0.91)			
VH	5.2(0.61)	3.93	98	<0.001	
LAVH	4(0.91)				

p value was less than <0.001 for all the groups and statistically significant.

According to **Cochrane review**¹ hospital stay was shorter for VH compared to TAH (mean difference of 2 days).

In a study done by **Warren et al.**⁶ evaluated the clinical and economic outcomes of laparoscopic (n = 3520), vaginal (n = 3130) and open abdominal hysterectomy (n = 8754), the length of hospital stay was shorter in the laparoscopic group (1.6 vs. 2.2 vs. 3.7 days respectively; p<0.001).

The ratio of hospital stay was comparable to other studies but mean hospital stay was significantly higher in our study because patients come from far places prefer to stay for comparatively longer durations.

V. Conclusion

From the present study, it can be concluded that:

TAH is associated with less mean operating time and minimal visceral injury when compared to VH and LAVH.

However wound infection rate, fever, post operative pain and hospital stay is more when compared to VH and LAVH.

VH is associated with less operating time compared to LAVH but more than TAH. However blood loss during surgery & fall in hemoglobin and need for transfusions is highest of all in VH. Postoperative urinary tract infections are more common in VH compared TAH and LAVH.

LAVH is associated with minimal blood loss, less post operative pain, shorter hospital stay and fewer incidence of post operative urinary tract infection. It took long operating time when compared to TAH and VH. Laparoscopic procedure need long learning curve and availability of infra structures.

No procedure is 100% ideal. The ideal method can be chosen for a patient by skilled surgeon by discussing with his patient.

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